

## Slicing through fruit price volatility

By Stephen B. Reed

Fruit prices are particularly ripe for analysis as they are free of some of the complexities of other price data. They are relatively undifferentiated; the average price of a banana is well defined in a way that the average price of a new vehicle or hospital services is not. There are not complicated quality change issues to worry about; grapes from 2014 are easily comparable with grapes from 2004 (unlike, for instance, televisions or computers). Fruit is frequently purchased and familiar to most consumers, so it is easy to put the price data into context.

The Bureau of Labor Statistics currently produces average price measures for a number of different fruits. There are seven for which reasonably continuous data are available for the past 10 years:

- Apples (Red Delicious)
- Bananas
- Oranges (navel)
- Grapefruit
- Lemons
- Strawberries
- Grapes (Thompson seedless)

Indexes, rather than average prices, are the official measure of price change in the CPI; however, it is still interesting to analyze the average price data, which is the focus of this article. All seven fruits have risen in price over the past decade. However, the rate of increase has varied significantly; lemon prices have risen more than twice as quickly as banana prices. (See table 1.)

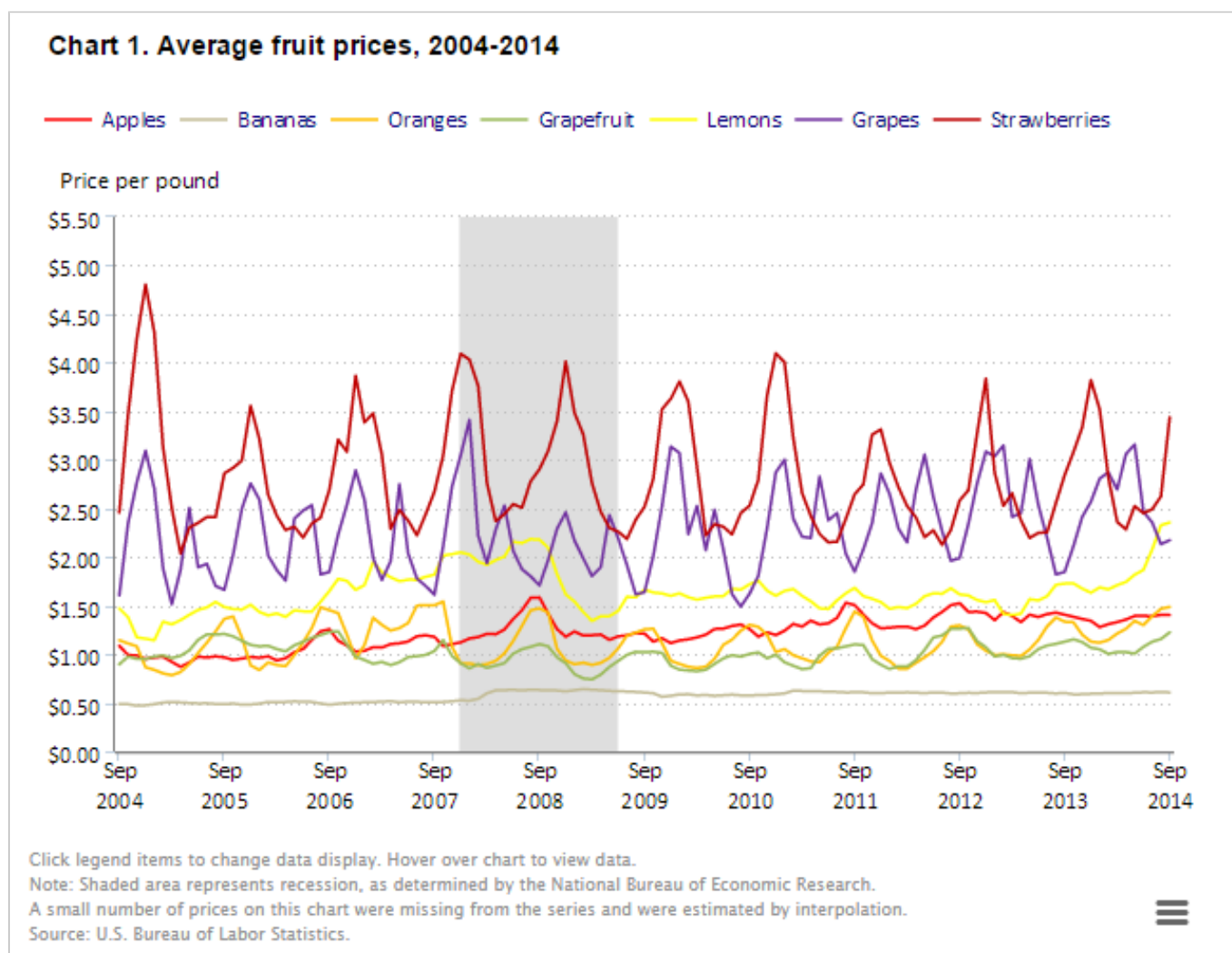
By comparison, the All Items CPI has increased 25.3 percent over the period, a 2.28-percent annual increase. So, all the fruits except bananas have increased more rapidly than the overall price level. Strawberries have been the most expensive fruit on a per-pound basis throughout virtually the entire period.<sup>1</sup>

Bananas have been the cheapest and have shown the slowest increase. Lemons have increased the most, though that is partly due to sharp increases over just the last few months of 2014. (See chart 1.)



**Table 1. Price levels and trends, average price in dollars per pound Sept. 2004—Sept. 2014**

Fruit	Price		Percent change	
	Sept. 2004	Sept. 2014	Total	Annualized
Apples	1.085	1.403	29.3	2.60
Bananas	0.488	0.606	24.2	2.19
Oranges	1.142	1.486	30.1	2.67
Grapefruit	0.895	1.224	36.8	3.18
Lemons	1.470	2.355	60.2	4.83
Strawberries	2.457	3.437	39.9	3.41
Grapes	1.605	2.173	35.4	3.08



The chart illustrates the varying seasonality and relative price levels of the fruits, but the volatility makes it difficult to visually discern average price trends over the period. All the fruit prices increased over the 2004–2014 timespan. Note that bananas, though appearing virtually flat, increased in price about 24 percent over the period. Several of the fruits showed

strong increases in the spring and summer of 2008, due to weather and rising gasoline prices, then declined into early 2009.

## Seasonality

A quick look at the chart immediately conveys an impression of volatility. Much of the apparent volatility comes from the high degree of seasonality in several of the series. Strawberries, aside from being the most expensive fruit per pound, show the highest degree of seasonality. Strawberry prices typically peak in December at a level around two-thirds higher than their June trough. Grape prices also usually peak in December, though their trough is usually in August and September and the differential is not as great as for strawberries.

Lemons and grapefruit show modest seasonality, with prices typically lowest in the spring and peaking in the fall. Oranges show a similar pattern, but with a sharper seasonal variation (typically around 50 percent) and an earlier trough, often in March.

Apple prices seem to peak around August, though the seasonality is very modest, with perhaps a 15-percent difference from trough to peak. Banana prices are exceptionally stable and show little seasonal variation.

## Fruit by fruit

**Apples (Red Delicious).** Apples were slightly over \$1 per pound through most of 2004 before falling under that figure late in the year. They climbed back above \$1 in 2006 and rose rapidly, reaching a peak of \$1.58 in September 2008. They fell back to \$1.14 only 3 months later, and have generally been between \$1.20 and \$1.50 since. As of September, they had been near \$1.40 for the last 5 months.

**Bananas.** Banana prices hovered around 50 cents through 2007, then climbed to a peak of around 64 cents in February 2009. They retreated to around 58 cents through late 2009 and 2010, then rose slightly and have since hovered very near the 60-cent mark.

**Oranges (navel).** Orange prices increased sharply early in the period, but have been relatively stable since 2006, with seasonal peaks in the \$1.40s and troughs at slightly under \$1 a pound. Orange prices actually peaked in 2007, though they have been at very nearly the same level for 8 years.

**Grapefruit.** Like oranges, grapefruit prices rose in 2005 and 2006, with the October 2006 seasonal peak of \$1.24 over 25 percent higher than the October 2004 peak of \$0.98. Prices then generally declined gradually through 2010, when the October peak was only \$1.02. Prices have recovered since and are now very close to the 2006 peak.

**Lemons.** Lemon prices were fairly stable in 2004 and 2005, with seasonal peaks near \$1.50. They rose sharply in 2007 and continued rising through 2008, peaking at \$2.18 before giving ground in 2009 and 2010. Prices were stable for next few years, with seasonal peaks in the \$1.60s. An upward trend was apparent in 2013 and has continued this year, with the September 2014 price of \$2.355 setting a new high.

**Grapes (Thompson seedless).** Grape prices have been more volatile than those for citrus fruits, but showed some downward trend early in the period; after exceeding \$3 in December 2004, they failed to reach that level again until 2008. Since then there has been some upward movement, with seasonal peaks around \$3.10. The September 2014 level of \$2.17 is the highest September figure in the series.

**Strawberries.** As noted, strawberries are very seasonal and volatile in price. Although the price shows nearly a 40-percent increase from September 2004 to September 2014, that is misleading, as the September 2014 price was up 31 percent from the previous month. The August 2014 figure was only about 8 percent above the August 2004 price, and the series actually peaked at \$4.80 in December 2004. Since then, strawberry prices have typically been between \$2 and \$4 depending on the time of year.

- Notes

<sup>1</sup>All of the average prices are published on a per-pound basis, except strawberries, which are published per 12 ounces. For this article, strawberry prices are converted to per-pound.

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